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Study of the domain evolution and transmittance on various temperature in PKN single crystal using in situ method

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High quality single crystal of Lead Potassium Niobate (PKN) was fabricated by Bridgman method through spontaneous nucleation and <001>-oriented slides were obtained. The full width at half maximum (FWHM) measured less than 22″. Strip-shaped domain observed in PKN single crystal sample by polarizing microscope. The domain and transmittance were investigated by in situ observation under different temperature. The results show that evolution of domains disappearing in heating process and appearing in cooling process gradually, and they are recovered during heating and cooling process. The transmittance influenced by temperature because of the scatter and reflection in domain walls. It is suggested that domains evolution and optical transmittance or absorption, can be employed the phase transition in ferroelectric crystals.